

CLAIMS

What is Claimed is:

1. A printed wiring board, comprising:
 - a first innerlayer panel, the first innerlayer panel comprising:
 - 5 a first electrode;
 - a dielectric disposed over the first electrode; and
 - a second electrode disposed over the dielectric, wherein the first electrode, the dielectric and the second electrode form a first capacitor; and
 - 10 a second innerlayer panel, the second innerlayer panel comprising:
 - a first electrode;
 - a dielectric disposed over the first electrode; and
 - a second electrode disposed over the dielectric, wherein the
- 15 first electrode, the dielectric and the second electrode form a second capacitor,
- 20 wherein the second innerlayer panel is stacked with the first innerlayer panel, the respective first electrodes are electrically coupled, and the respective second electrodes are electrically coupled, thereby connecting the first and second capacitors in parallel.
2. The printed wiring board of claim 1, comprising:
 - a third innerlayer panel, the third innerlayer panel
- 25 comprising:
 - a first electrode;
 - a dielectric disposed over the first electrode; and

a second electrode disposed over the dielectric, wherein the first electrode, the dielectric and the second electrode form a third capacitor,

5 wherein the third innerlayer panel is stacked with the first and second innerlayer panels, the respective first electrodes are electrically coupled, and the respective second electrodes are electrically coupled, thereby connecting the first, second and third capacitors in parallel.

10 3. The printed wiring board of claim 1, wherein the first innerlayer panel comprises:

a third electrode spaced from the second electrode by the dielectric and electrically coupled to the first electrode, wherein the dielectric is a two-layer dielectric.

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4. The printed wiring board of claim 3, wherein the first innerlayer panel comprises:

a fourth electrode spaced from the third electrode by the dielectric and electrically coupled to the second electrode, wherein the dielectric is a three-layer dielectric.

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5. The printed wiring board of claim 1, wherein:

the respective first electrodes are electrically coupled by a first conductive via; and

25 the respective second electrodes are electrically coupled by a second conductive via.

6. A method of making a printed wiring board, comprising:

forming a first innerlayer panel, wherein forming the first innerlayer panel comprises:

forming a first electrode;

forming a dielectric over the first electrode; and

5 forming a second electrode over the dielectric, wherein the first electrode, the second electrode, and the dielectric form a first capacitor;

forming a second innerlayer panel, wherein forming the second innerlayer panel comprises:

10 forming a first electrode;

forming a dielectric over the first electrode; and

forming a second electrode over the dielectric, wherein the first electrode, the second electrode, and the dielectric form a second capacitor;

15 stacking the first and second innerlayer panels;

electrically coupling the respective first electrodes; and

electrically coupling the respective second electrodes, thereby connecting the first and second capacitors in parallel.

20 7. The method of claim 6, further comprising:

forming a third innerlayer panel, wherein forming the third innerlayer panel comprises:

forming a first electrode;

forming a dielectric over the first electrode; and

25 forming a second electrode over the dielectric, wherein the first electrode, the second electrode and the dielectric form a third capacitor;

stacking the third innerlayer panel with the first and second innerlayer panels;

electrically coupling the first electrode of the third capacitor to the first electrodes of the first and second capacitors; and

5 electrically coupling the second electrode of the third capacitor to the second electrodes of the first and second capacitors.

8. The method of claim 6, wherein forming the first innerlayer
10 panel comprises:

forming a third electrode spaced from the second electrode by the dielectric and electrically coupled to the first electrode, wherein the dielectric is a two-layer dielectric.

15 9. The method of claim 8, wherein forming the first innerlayer panel comprises:

forming a fourth electrode spaced from the third electrode by the dielectric and electrically coupled to the second electrode, wherein the dielectric is a three-layer dielectric.

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10. The method of claim 6, wherein:

electrically coupling the first electrodes comprises forming a first conductive via; and

25 electrically coupling the second electrodes comprises forming a second conductive via.

11. A printed wiring board, comprising:

a plurality of stacked innerlayer panels, at least one of the innerlayer panels comprising:

a first electrode made from a foil;
a first dielectric disposed over a first side the first electrode;
a second dielectric disposed over a second side of the first
electrode;

5 a second electrode disposed over the first dielectric; and
a third electrode disposed over the second dielectric,

wherein the first electrode, the first dielectric, the second
dielectric, the second electrode, and the third electrode form a
capacitor.

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12. The printed wiring board of claim 11, wherein:

a termination of the first electrode is within a footprint of the
first electrode;

15 a termination of the second electrode is within a footprint of
the second electrode; and

a spacing between the terminations is less than a width of
the first electrode.

20 13. The printed wiring board of claim 11, wherein the second
electrode is electrically coupled to the third electrode.

14. The printed wiring board of claim 11, comprising:

a laminate material disposed over the first side of the first
electrode;

25 a first conductor electrically coupled to the first electrode,
wherein the first conductor extends through the laminate material;
and

a second conductor electrically coupled to the second electrode.

15. The printed wiring board of claim 11, comprising:

5 a fourth electrode disposed over the first dielectric and electrically coupled to the first electrode.

16. The printed wiring board of claim 15, comprising:

10 a fifth electrode disposed over the second dielectric and electrically coupled to the first electrode, wherein the second and third electrodes are electrically coupled.

17. A method of making a printed wiring board, comprising:

15 forming a plurality of innerlayer panels, wherein forming at least one of the innerlayer panels comprises: /

providing a metallic foil;

forming a first dielectric over a first side of the foil;

forming a second electrode over the first dielectric;

forming a second dielectric over a second side of the foil;

20 forming a third electrode over the second dielectric;

forming a first electrode from the foil; and

stacking the plurality of innerlayer panels.

18. The method of claim 17, comprising:

25 forming a laminate material over the first side of the metallic foil;

forming a first conductor, wherein the first conductor electrically connects to the first electrode; and

forming a second conductor, wherein the second conductor electrically connects to the second electrode.

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19. The method of claim 17, comprising:

forming a fourth electrode over the first dielectric; and

forming a fifth electrode over the second dielectric.

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20. The method of claim 17, wherein forming one or more of the electrodes includes a firing.

21. A printed wiring board, comprising:

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a plurality of stacked innerlayer panels, at least one of the innerlayer panels comprising:

a plurality of first electrodes disposed in a plane;

a plurality of first conductive portions electrically connecting the first electrodes;

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a plurality of second electrodes formed from a metallic foil;
a plurality of second conductive portions electrically connecting the second electrodes; and

a dielectric separating the first electrodes from the second electrodes, wherein

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the first and second electrodes are arranged so that the first electrodes are spaced across the dielectric from the second electrodes to form a plurality of capacitors.

22. The printed wiring board of claim 21, comprising:

a first laminate material disposed over the plurality of first electrodes; and

a second laminate material disposed over the plurality of second electrodes.

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23. The printed wiring board of claim 22, comprising:

a conductor extending through at least one of the first laminate material and the second laminate material and electrically coupled to the plurality of first electrodes.

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24. The printed wiring board of claim 23, wherein the conductor extends through the dielectric.

15 25. The printed wiring board of claim 21, wherein the first electrodes are substantially identical in plan view shape to the second electrodes.

20 26. A method of making a printed wiring board, comprising:
forming a plurality of innerlayer panels, wherein forming at least one of the innerlayer panels comprises:

providing a metallic foil;

forming a dielectric layer over the metallic foil;

25 forming a plurality of first electrodes and a plurality of first conductive portions over the dielectric layer, wherein the first conductive portions electrically connect the first electrodes; and

forming a plurality of second electrodes and a plurality of second conductive portions from the metallic foil, wherein the plurality of second conductive portions electrically connect the second electrodes, and wherein

the first and second electrodes are arranged so that the first electrodes are spaced across the dielectric layer from the second electrodes to form a plurality of capacitors; and

stacking the innerlayer panels.

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27. The method of claim 26, wherein forming the at least one innerlayer panel comprises:

forming a first laminate material over the plurality of first electrodes; and

10 forming a second laminate material over the plurality of second electrodes.

28. The method of claim 26, wherein forming the plurality of first electrodes and the plurality of first conductive portions comprises:

15 depositing a conductive layer over the dielectric layer.

29. The method of claim 28, wherein forming the plurality of first electrodes and the plurality of first conductive portions comprises:

firing the conductive layer and the dielectric layer.

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30. The method of claim 26, wherein forming the plurality of second electrodes and the plurality of second conductive portions from the metallic foil comprises:

etching the metallic foil.